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ADVAITA VEDANTA AND MEDICAL SCIENCE

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The concept of *advaita vedanta* is not only a school of Hindu philosophy and religious practice, and one of the classic Indian paths to spiritual realization but also have deep relationship and implications regarding the field of modern science, medical science and other human instincts. In this particular paper a brief discussion is attempted relating to the medical science and its relationship with *advaita Vedanta*.

The conception of the soul means that in essence we are not our bodies but something divine and transcendent. This gives religions justification for their existence, as each claims to offer our true identity, our soul, some kind of reward for following the religion's dictums–even when such teachings seem contrary to the demands of our bodies. It also means that we are, in principle, immortal, and the present life in our bodies is a mere shadow. The soul allows religions to promise rewards for all eternity in return for obedience in this life. The soul provides the raison deter for all religious teaching.

But here too science has changed all our perceptions. Modern medical knowledge has now deciphered many of the mysteries of the body, and its functioning is understood to a great extent, without any need to posit something outside the physical body to account for the presence of life. Our present knowledge has shown that the functioning of the human body is, in fact, a mechanical working-out of the laws of physics and biochemistry. A study of the origin, structure, and functions of the fundamental constituents of our body, the proteins, shows us how self-sufficient and systematic our bodies are.

Life on earth is based on the carbon atom, and all organic chemicals have carbon as their base. Carbon is so important because it has as many as six valences, or & qot; arms & qot; to which other atoms can be attached, and it is also very stable. Because of carbon's large number of potential links, like the central piece in a do-it-yourself toy, several atoms (up to six) can be attached to a single carbon atom on its arms, and when other carbon atoms are attached, very large and complex molecules can be created. Some other atoms, such as silicon, also have this property, so we may well find silicon-based life on some other planet.

In the case of amino acids, a central carbon atom combines with oxygen, hydrogen, and nitrogen atoms on its different arms to form an amino acid molecule. Different arrangements of the other atoms give different amino acids, each with slightly different properties. The final three-dimensional shape of a protein and its properties are determined by the amino acids forming the protein and the electrophysiological interactions between them. A change of even a single amino acid could change the shape of the whole protein and its properties.

The Na–K pump has a very important effect as it ensures that the sodium concentration is low inside the cell compared to the outside while potassium is just the opposite, being higher inside. The difference in turn makes the cell wall negatively charged, which keeps it in a state of electrical tension which can be set off by a number of factors, such as nerve signals. This essential property is called the membrane potential.

The membrane potential gives rise to all the signals in our brain and nerves, and causes our motor movements and sensory perceptions. Electrical signals in our nerves are only a movement of a wave of depolarisation along the cell membrane of the cells of the nerve, where the cell wall during the wave becomes momentarily positive instead of negative. The positive ripple is sent from the brain to all the organs in our body through the nerves. Depolarisation brought about by the ripple in the cell walls of different organs causes different effects in them.

In the brain, each brain cell consists of a cell body and an elongated process, the axon, along with several smaller processes which connect to other cells. Each cell in turn receives connections from processes of many other cells. When a cell depolarises, its signal of depolarisation flows along its process to all the cells it connects with, and causes a tendency of depolarisation in them. Cells can also send signals of hyperpolarisation, which makes the cell resistant to depolarisation. Thus each cell is receiving at the same time different signals of depolarisation, neutral and hyperpolarisation. The balance of signals to it at any given time determines whether the cell will fire or not. when the signals reach a point, the cell will 'fire', sending a wave of 'positiveness' along its axon, which will in turn 'positivise' the organs to which it connects, for example, a muscle cell. From the time it is 'switched' on, presumably in the foetal stage, the brain is constantly buzzing with these signals running back and forth between the cells, somewhat like a controlled nuclear reaction. The system is not unlike a computer, where each brain cell is analogous to a transistor in a chip. The extremely complex connections between brain cells thus determine the processing that goes on in our minds. Depolarisation signals transmitted along the nerves cause the contraction of muscles. The nerves connect the brain cells to the muscles, and when a particular brain cell depolarises, it sends this positive wave along the nerve till it reaches its corresponding muscle fibre, where it causes depolarisation of the muscle. When the muscle cell wall gets depolarised, it causes a contortion in calcium receptacles inside the cells, which releases calcium ions. Inside the cells are two important protein molecules, actin and myosin. The actin rests on the myosin and is connected to it by numerous leg-like bridges. When the cell is flooded by calcium, the disturbance in the electro-physical environment causes these bridges to move, making the actin 'crawl' on the myosin pretty much like a caterpillar. This causes muscle contraction. When the depolarisation stops, the calcium goes back and the actin reverses, causing relaxation.

Our senses also are caused by this transmission of depolarisation waves, only this time it is in the opposite direction, into the brain. In the eye, for example, the cells in the retina contains a light sensitive chemical, rhodopsin, which when it receives light energy, gets changed into retinal acid. This change disturbs the environment and causes depolarisation or 'positiveness' of the retinal cells, and this wave of positivity is then sent as a signal through the nerves back to the brain. The spent rhodopsin is re–energized in a chemical reaction regulated by other protein enzymes which uses the energy derived from glucose brought in by blood to recharge it. Three types of retinal cells, each sensitive to a basic colour just like in a TV camera, gives us colour vision. In the ear, sound energy is transmitted to special cells called 'hair cells', which have the property that when they are distorted mechanically, they get depolarised. Sound waves cause this distortion when they strike the cells, and thus the signal is set up. Touch receptors in the skin also send signals in the same way when they get distorted by pressure.

All the functions of the body can be explained in this way, simply and mechanistically. The beating of the heart, for example, is only due to some specially constituted proteins in the heart muscle cells that polarize and depolarize rhythmically as long as they are supplied with energy in the form of ATP. They will continue to beat even in a petri dish. Other functions –such as the excretory function of the kidneys, digestion, and absorption of food – are all also due to the working of different specialized proteins.

The unfolding and growth of the fetus is likewise controlled entirely by the production of different proteins in a predetermined sequence by the DNA in our chromosomes. In this way, modern science has shown that all the functions of the body are actually systematic and straightforward, and are carried out by simple chemical structures, such as proteins. At present, all functions of the body –except, perhaps, the working of the mind –have been shown to be purely mechanical. There is no need of a supernatural solution, such as the soul, to explain them. In the case of the brain, the basics of the pathways and the manner of functioning–that is, the "hardware"–is already known; it is only the "software" that remains to be deciphered. We can rest assured that scientists will one day be able to unravel much of the way our brains think.

Here, too, there is no place for the soul to step in; there certainly seems to be no juncture where the brain could interact with such a "ghost" in order to produce thoughts. If the body itself can explain all aspects of physical life satisfactorily, then the theory of the soul can no longer be sustained. The soul as an explanation is unnecessary now, in the light of our present knowledge.